

Novel Deployable High Frequency Antennas Using Composite Electro-Textiles, Phase II

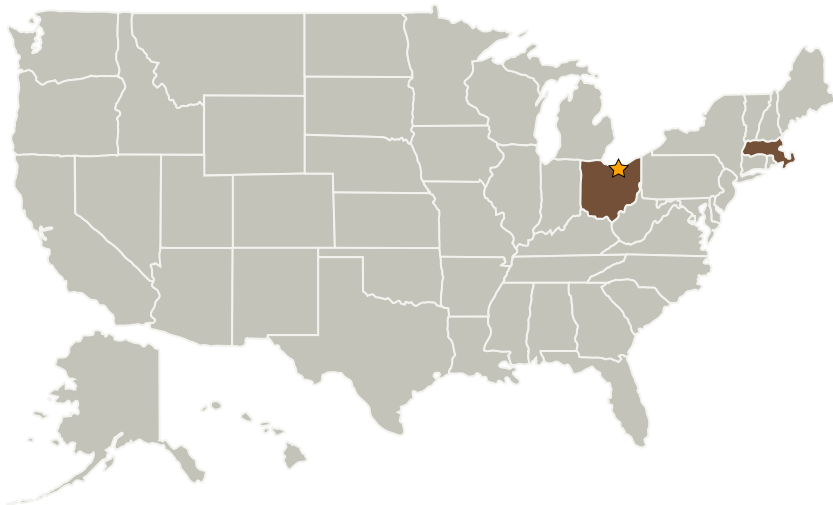
Completed Technology Project (2006 - 2008)



Project Introduction

In this Phase I program, the Infoscitex (IST) team focused primarily on the design and fabrication of a prototype high accuracy electro-textile mesh leading to a prototype that weighed 0.42 kg/m² and provided 99.8 percent reflectivity during testing at 38GHz. Light weight composite fiber core materials have been identified for the Phase II effort allowing the team to extrapolate a mesh areal weight of 0.21 kg/m². During the Phase I effort, the IST team also investigated passive inter-modulation (PIM) testing and developed material based design solutions to eliminate PIM for these prototype meshes. Limited US facilities exist for testing high frequency generated PIM and as a result, both the IST team and NASA have pledged to develop this service for both the NASA exploration and Air Force Responsive Space programs in the proposed Phase II program. A unique wrapped rib approach to providing precision deployable antenna structures was also investigated. The resulting preliminary antenna support structure design was estimated to have an areal weight of 0.88 kg/m². With refinements in Phase II, the structure is envisioned to provide sufficient shape definition for the parabolic antenna surface accuracy requirements for Ka band communication.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Infoscitex Corporation	Supporting Organization	Industry	Waltham, Massachusetts

Primary U.S. Work Locations

Massachusetts	Ohio
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.2 Radio Frequency
 - └ TX05.2.6 Innovative Antennas